Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Client:	USACE Portland District	**Date:**	October 11, 2021
Address:	333 SW First Ave, P.O. Box 2946	**Project:**	Q.C. - Bonneville Nav Lock 1
	Portland, OR 97208	**Project #:**	21B168-02
Attn:	Dominic Yballe	**Sample #:**	B21-1971
Date Revised:		**Date Sampled:**	August 12, 2021

As requested MTC, Inc. has performed the following test(s) on the sample referenced above. The testing was performed in accordance with current applicable AASHTO or ASTM standards as indicated below. The results obtained in our laboratory were as follows below or on the attached pages:

	Test(s) Performed:	Test Results		Test(s) Performed:	Test Results
X	Sieve Analysis	SM, Silty Sand		Sulfate Soundness	
	Proctor			Bulk Density & Voids	
	Sand Equivalent			WSDOT Degradation	
	Fracture Count				
	Moisture Content				
	Specific Gravity, Coarse				
	Specific Gravity, Fine				
X	Hydrometer Analysis	Loamy Sand			
	Atterberg Limits				
	Asphalt Extraction/Gradation				
	Rice Density				

If you have any questions concerning the test results, the procedures used, or if we can be of any further assistance please call on us at the number below.

Respectfully Submitted,
Meghan Blodgett-Carrillo
WABO Supervising Laboratory Technician

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Sieve Report

Project: Q.C. - Bonneville Nav Lock 1
Project #: 21B168-02
Client: USACE Portland District
Source: NL1-COMP
Sample#: B21-1971

Date Received: 28-Sep-21
Sampled By: Client
Date Tested: 4-Oct-21
Tested By: K. Mendez

ASTM D-2487 Unified Soils Classification System
SM, Silty Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01, 1366.02 & 1366.04

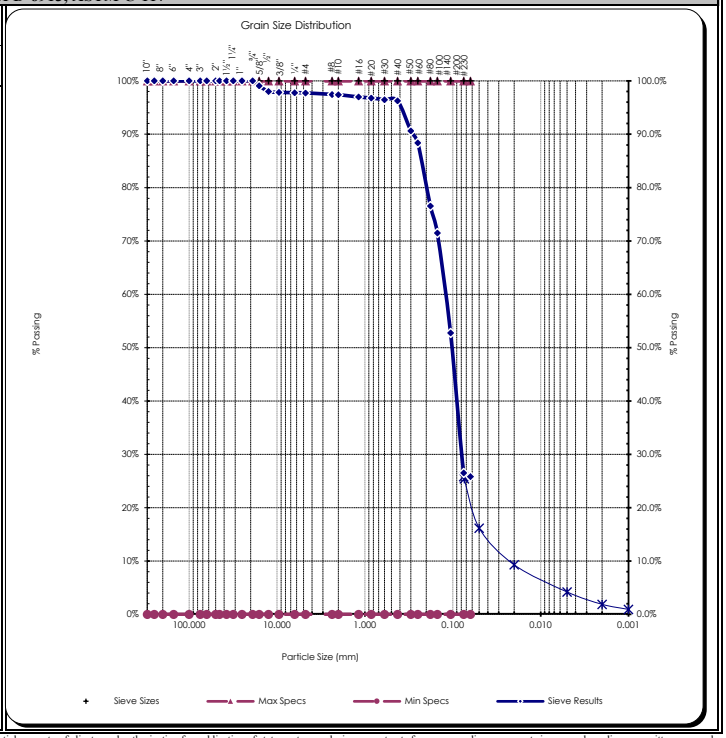
ASTM D-2216, ASTM D-2419, ASTM D-4318, ASTM D-5821

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.012 mm	% Gravel =	2.2%	Coeff. of Curvature, C_C =	2.09
$D_{(10)}$ =	0.024 mm	% Sand =	72.0%	Coeff. of Uniformity, C_U =	5.04
$D_{(15)}$ =	0.037 mm	% Silt & Clay =	25.8%	Fineness Modulus =	0.51
$D_{(30)}$ =	0.079 mm	Liquid Limit =	n/a	Plastic Limit =	n/a
$D_{(50)}$ =	0.103 mm	Plasticity Index =	n/a	Moisture %, as sampled =	n/a
$D_{(60)}$ =	0.123 mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =	
$D_{(90)}$ =	0.286 mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =	
Dust Ratio =	26/97	Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =	

ASTM C-136, ASTM D-6913, ASTM C-117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		99%	100.0%	0.0%
1/2"	12.50	98%	98%	100.0%	0.0%
3/8"	9.50	98%	98%	100.0%	0.0%
1/4"	6.30		98%	100.0%	0.0%
#4	4.75	98%	98%	100.0%	0.0%
#8	2.36		97%	100.0%	0.0%
#10	2.00	97%	97%	100.0%	0.0%
#16	1.18		97%	100.0%	0.0%
#20	0.850	97%	97%	100.0%	0.0%
#30	0.600		96%	100.0%	0.0%
#40	0.425	96%	96%	100.0%	0.0%
#50	0.300		91%	100.0%	0.0%
#60	0.250	88%	88%	100.0%	0.0%
#80	0.180		77%	100.0%	0.0%
#100	0.150	72%	72%	100.0%	0.0%
#140	0.106	53%	53%	100.0%	0.0%
#200	0.075	27%	27%	100.0%	0.0%
#230	0.063	25.8%	25.8%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

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Hydrometer Report

Project:	Q.C. - Bonneville Nav Lock 1	**Date Received:**	28-Sep-21
Project #:	21B168-02	**Sampled By:**	Client
Client :	USACE Portland District	**Date Tested:**	4-Oct-21
Source:	NL1-COMP	**Tested By:**	K. Mendez
Sample#:	B21-1971		

ASTM D 2487 Soils Classification
SM, Silty Sand
Sample Color
brown

ASTM D-422, HYDROMETER ANALYSIS

Assumed Sp Gr :	2.65	
Sample Weight:	75.57	grams
Hydroscopic Moist.:	2.94%	
Adj. Sample Wgt :	73.41	grams

ACCREDITED
Certificate #: 1366.01, 1366.02 & 1366.04

Hydrometer Reading Minutes	Corrected Reading	Percent Passing	Soils Particle Diameter
2	8.5	11.3%	0.0374 mm
5	7.6	10.1%	0.0238 mm
15	6	8.0%	0.0138 mm
30	5.5	7.3%	0.0098 mm
60	4	5.3%	0.0070 mm
250	2.5	3.3%	0.0035 mm
1440	1	1.3%	0.0014 mm

% Gravel:	2.2%	**Liquid Limit:**	n/a
% Sand:	72.0%	**Plastic Limit:**	n/a
% Silt:	21.6%	**Plasticity Index:**	n/a
% Clay:	4.2%		

ASTM C-136

Sieve Analysis
Grain Size Distribution

Sieve Size	Percent Passing	Soils Particle Diameter
3.0"	100%	75.000 mm
2.0"	100%	50.000 mm
1.5"	100%	37.500 mm
1.25"	100%	31.500 mm
1.0"	100%	25.000 mm
3/4"	100%	19.000 mm
5/8"	99%	16.000 mm
1/2"	98%	12.500 mm
3/8"	98%	9.500 mm
1/4"	98%	6.300 mm
#4	98%	4.750 mm
#10	97%	2.000 mm
#20	97%	0.850 mm
#40	96%	0.425 mm
#100	72%	0.150 mm
#200	25.8%	0.075 mm
Silts	25.4%	0.074 mm
	16.2%	0.050 mm
	9.3%	0.020 mm
Clays	4.2%	0.005 mm
	1.9%	0.002 mm
Colloids	0.9%	0.001 mm

USDA Soil Textural Classification

	Particle Size
% Sand:	2.0 - 0.05 mm
% Silt:	0.05 - 0.002 mm
% Clay:	< 0.002 mm

USDA Soil Textural Classification
Loamy Sand

Comments:

Reviewed by: Meghan Blodgett-Carrillo

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